

Applicant:	Yuriy Gmirya	Group Art Unit:	3681
Serial No.:	10/621,129	Examiner:	Le, David D.
Filed:	July 16, 2003		
Title:	<b><i>SPLIT-TORQUE GEAR BOX</i></b>		

**DECLARATION UNDER RULE 1.131**

- 1) I have reviewed the above-referenced application and the documents associated with the filing and prosecution thereof.
- 2) I am the inventor in the above-referenced application; I am employee of Sikorsky Aircraft Corporation, of 6900 Main Street, P.O. Box 9729, Stratford, CT 06615-9129; and I am subject to assignment of the above-referenced application thereto.
- 3) I have assigned my entire interest in the above-referenced application to Sikorsky Aircraft Corporation, of 6900 Main Street, P.O. Box 9729, Stratford, CT 06615-9129.
- 4) The invention disclosure was prepared by me on a date before the effective 35 U.S.C. 102(e) date of *2004/0237684 a1* to *Bossler*, which claims the date of provisional application No. 60/473,858 which is May 28, 2003. Exhibit A attached to this Declaration is a copy of an invention disclosure document that was completed prior to May 28, 2003. The signature page is page 1 of the document, and I have signed the disclosure not only in the signature block but also adjacent the figures. Two persons have also witnessed my signature and understood the inventive concept at that time. Dates on the signature pages and the dates on the drawings included in the disclosure form have been redacted, but I have looked at these dates and all of the dates are prior to May 28, 2003.

- 5) I was informed of the decision made to prepare and file a patent application by Sikorsky Aircraft Corporation. Diligence was maintained throughout the preparation and filing of the application. The subject application was filed on July 16, 2003.
- 6) I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: April 13, 2005

  
Yuriy Gmirya

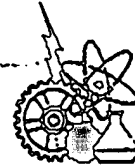
N:\Clients\SIKORSKY\IP00070\PATENT\DECLARATION UNDER RULE 1.131 - yuriy.doc



# PATENT DISCLOSURE FORM

SEE REVERSE SIDE FOR INSTRUCTIONS

Received  
Sikorsky Aircraft  
Legal - Patents  
Dept.



5-5668

TITLE: SPLIT TORQUE GEARBOX

INVENTOR 01 (PRINT - LAST, FIRST, MIDDLE)

BADGE #

GMIRYA YURIY

531804

ADDRESS

28 RICE RD., WOODBRIDGE, CT 06525

MS / W. EXT.

INVENTOR 02 (PRINT - LAST, FIRST, MIDDLE)

BADGE #

ADDRESS

MS / W. EXT.

INVENTOR 03 (PRINT - LAST, FIRST, MIDDLE)

BADGE #

ADDRESS

MS / W. EXT.

INVENTOR 04 (PRINT - LAST, FIRST, MIDDLE)

BADGE #

ADDRESS

MS / W. EXT.

PROVIDE INFORMATION  
AS APPLICABLE  
TO YOUR INVENTION

CONTRACT NUMBER:

PROGRAM:

CHARGE NUMBER:

AIRCRAFT MODEL:

CH 33X, COAXIAL HEAVY LIFT

FIRST PRODUCTION USE

FIRST SKETCH

PROVIDE DATES  
AS APPLICABLE  
TO YOUR INVENTION

CONCEIVED

TESTED / DEMONSTRATED

HAS THE INVENTION APPEARED IN A SIKORSKY PROPOSAL?

☐ YES

☒ NO

- IF YES, INDICATE PROPOSAL TITLE, NUMBER, AND DATE

WAS THE INVENTION DISCLOSED IN ANY PRINTED DOCUMENTS?

☐ YES

☒ NO

- IF YES, INDICATE TITLE AND DATE OF PUBLICATION

(INCLUDE CONTRACT REPORTS, TECHNICAL PAPERS, JOURNALS, ETC.)

HAS OR WILL THE INVENTION BE ORALLY PRESENTED TO PERSONS OTHER THAN SIKORSKY EMPLOYEES?

☒ YES

☐ NO

- IF YES, TO WHOM, WHEN, AND WHERE?

NAVIAIR REVIEW

ARE THERE ADDITIONAL DRAWINGS / DESCRIPTION OF THE INVENTION NOT INCLUDED IN THIS DISCLOSURE?

☒ YES

☐ NO

PLEASE INDICATE THE POTENTIAL FOR THE INVENTION TO RESULT IN A COMMERCIALY EXPLOITABLE PRODUCT FOR SIKORSKY / UTC.

☒ HIGH - Applies to inventions having broad applicability (i.e., applicable beyond the helicopter field and / or capable of becoming a successful consumer product).

☐ MODERATE - Inventions restricted to the helicopter field but of generic applicability (i.e., not limited to manufacture or model).

☐ LOW - Inventions restricted to military use.

ATTACHED HERETO ARE 4 PAGES OF DISCLOSURE, SIGNED AND DATED

INVENTOR'S SIGNATURE(S)

*Yuriy Gmirya*

DATE

*[Signature]*

2

DATE

DATE

4

DATE

WITNESSED AND UNDERSTOOD BY ME THIS

DAY OF

*[Signature]*

29

SIGNATURE

*[Signature]*

WITNESSED AND UNDERSTOOD BY ME THIS

DAY OF

*[Signature]*

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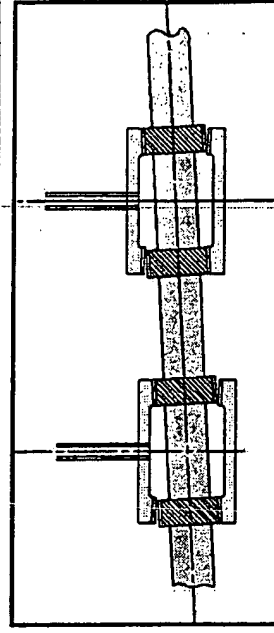
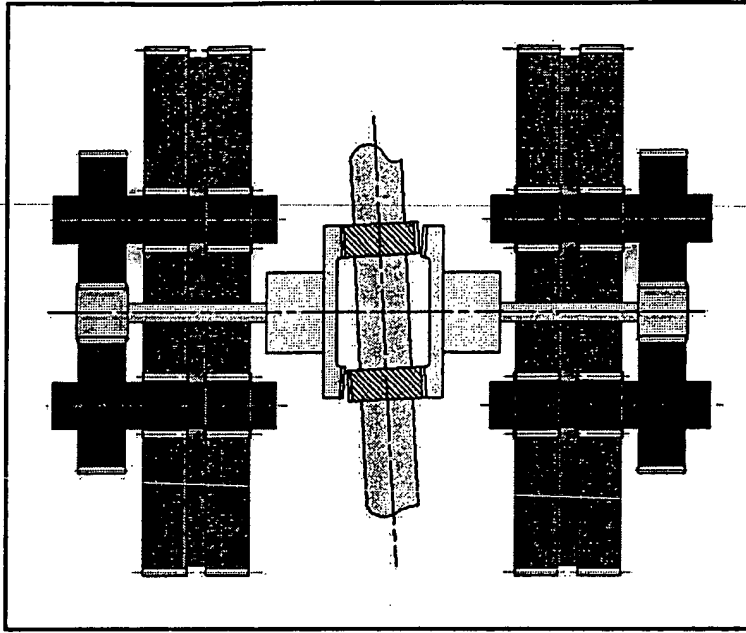
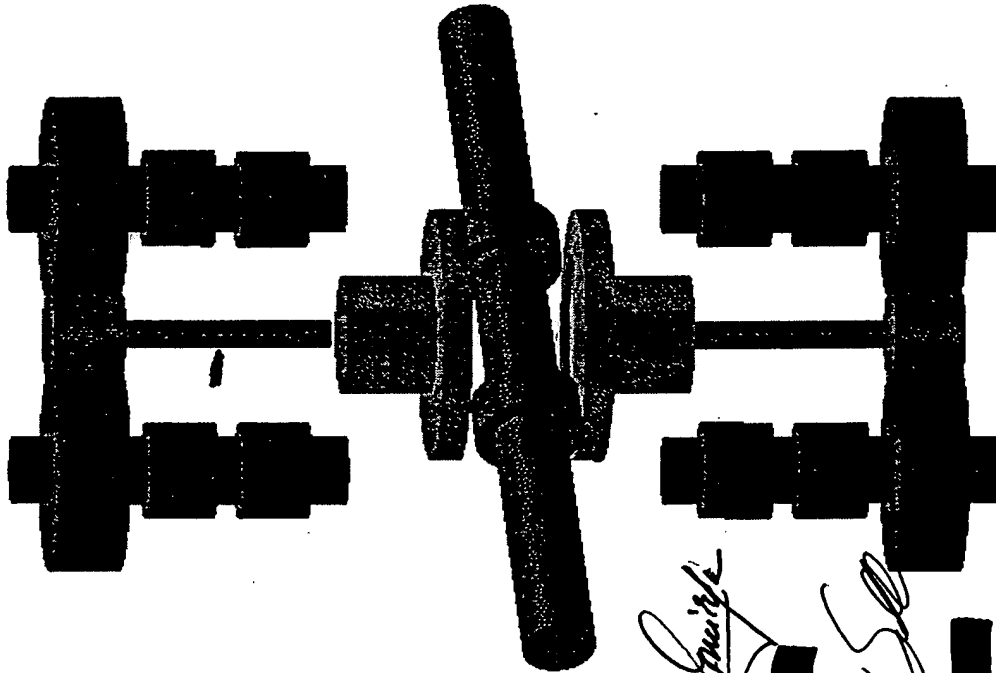
**Sikorsky**

A United Technologies Company

# CH-53X POWER TRAIN MODIFICATION

## Split Module

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INVENTOR: *Sherry Guirke*

WITNESSED: *W. W. S.*

*Alex. Smith*

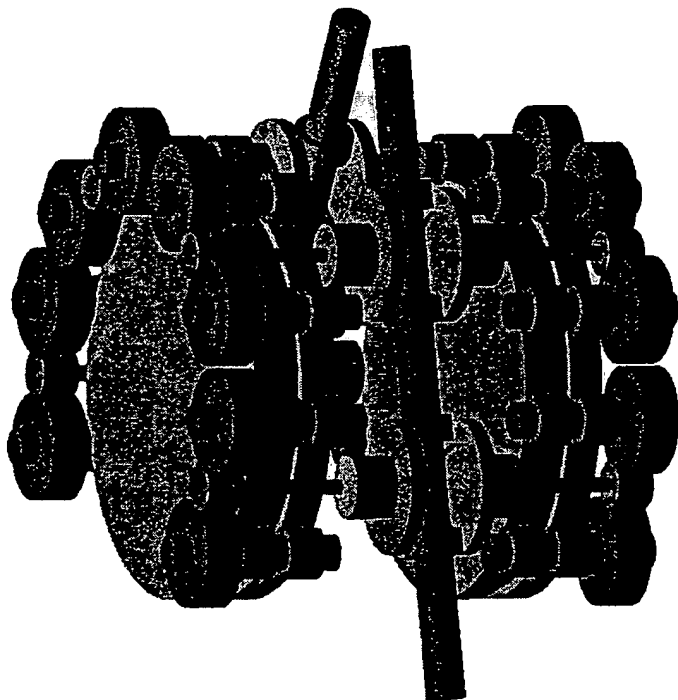
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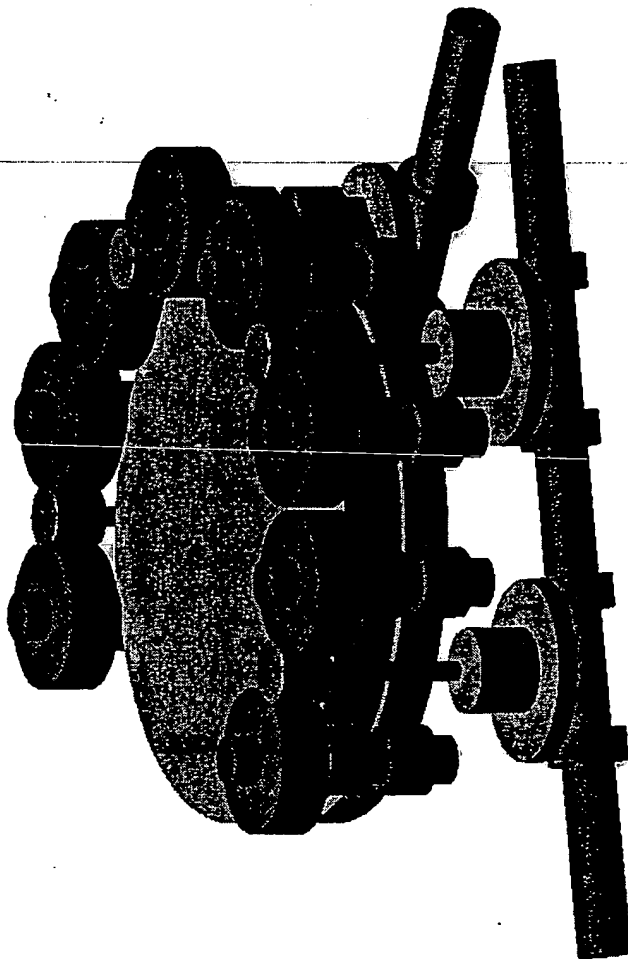
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A United Technologies Company

## CH-53X POWER TRAIN MODIFICATION

### Split Torque Main Gearbox



32 points contact



16 points contact

INVENTOR: *Philip J. Imhof*

WITNESSED: *W. H. Smith*



*W. H. Smith*

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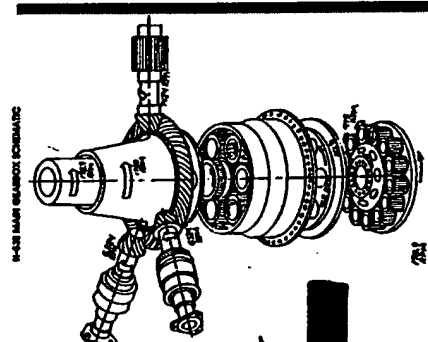


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# CH-53X POWER TRAIN MODIFICATION

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Parts Quantity					
Planetary MGB			Split Torque MGB (32)		Split Torque MGB (32)
Stage	Gears	Bearings	Gear Shafts	Bearings	Gear Shafts
First	4	14	12	24	
Second	8	12	24	32	
Third	15	26	2		
Total	27	52	38		
Parts					
Two Carriers		8	7		
		4410			



INVENTOR:

*David G. Gierke*

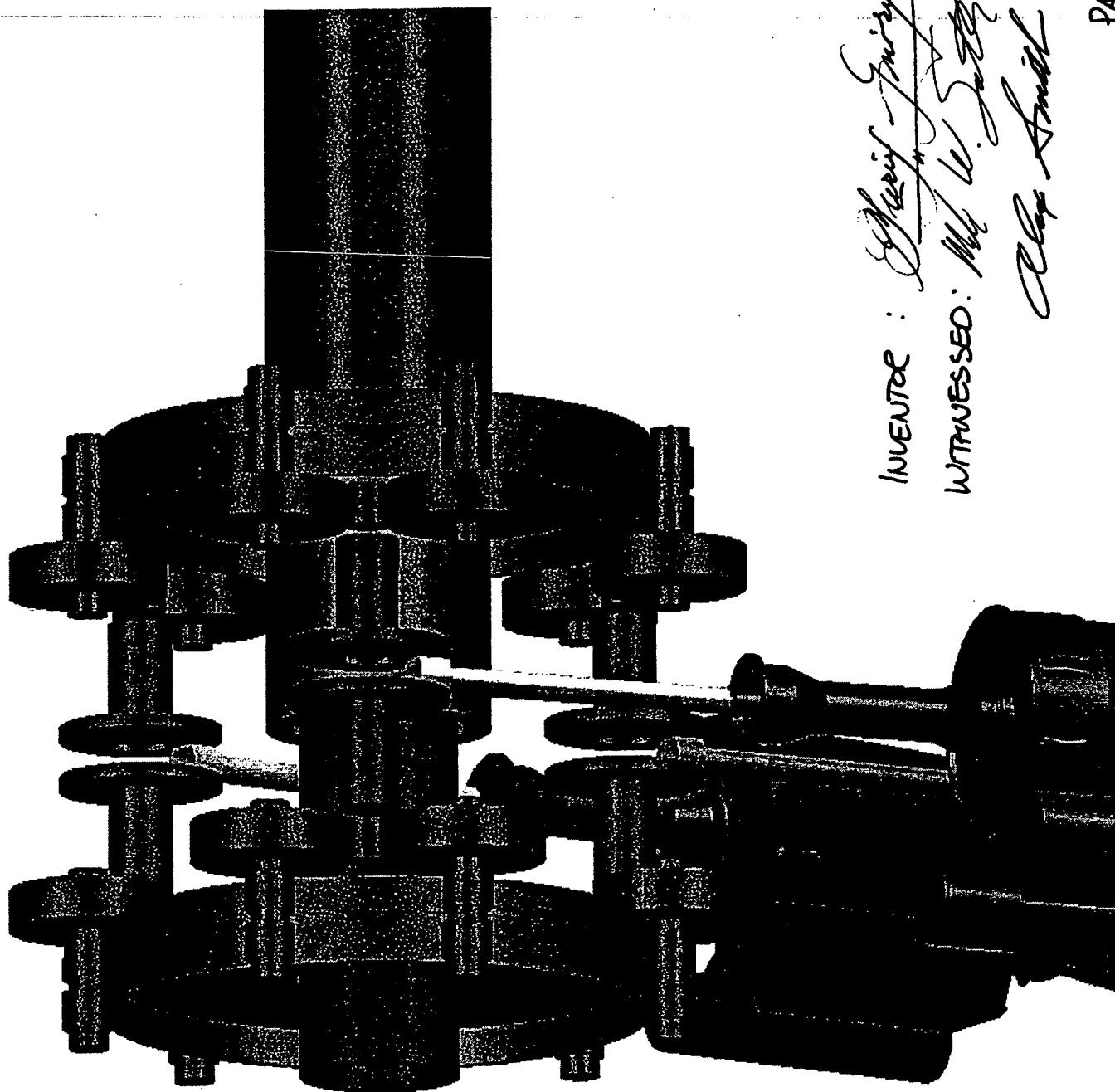
WITNESSED:

*W. W. Gierke*

*Alan Smith*

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# COAXIAL POWER TRAIN



INVENTOR : *Shirley Givins*

WITNESSED: *W. W. Givins*

*Clay Smith*

## **SPLIT TORQUE GEARBOX**

### **Split Torque Gearbox Design**

The proposed Split Torque Gearbox is a multiple path, three stages power gear train that transmits torque from a high-speed engine to a low speed output shaft, providing equal gear load distribution due to floating pinion in the second stage of reduction. The gearbox is primarily designed for a single rotor application, but can be easily transformed into dual rotor (coaxial) design.

The major component of the gearbox is a Split Module. The number of the Split Modules in the gearbox depends on aircraft configuration, number of engines and transmitted power. These modules are located around a last stage output gear that combines power from each one and transmits it to the main rotor. The floating pinion, which is a part of the second stage of reduction, provides equal load balance between all gears engaged in the power train.

The Split Torque Gearbox consists of the following stages:

- The first stage – Face Gears or Spiral Bevel Mesh.
- The Second Stage – Spur Gears.
- The third Stage – Double Helical Mesh.

The Split Torque Gearbox brings the following advantages:

- weight reduction,
- flexible design (single/dual rotor),
- fewer number of parts,
- low risk conventional gears,
- increase in reliability of the drive system due to redundant load path,
- reduction in production cost.